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SPECIFICATION

HALF CIRCLE WINDOW SHUTTER/BLIND

FIELD OF THE INVENTION

The present invention relates to a shutter for a half circle or arched window in general and in particular to a spring suspension of individual slats in the shutter.

BACKGROUND OF THE INVENTION

Venetian blinds are used to prevent direct sunlight from entering a house or other building and are typically made of a number of parallel rectangular slats or blades, each of which are supported by one of the rungs of a ladder-shaped fabric segment installed at each end of the blades. Venetian blinds are therefore limited to an essentially rectangular configuration. Arched or semi-circular windows are popular in many types of architectural design creating a need for a covering to prevent the passage of direct sunlight through the window.

Shutters for half circle or arched windows present problems involving the size, shape, weight and ability to interlock of the slats which are not associated with the more common venetian blinds. The prior art involving inventions for covering circular or half-circular openings fall into two general categories. The first category utilizes blinds or slats which pivot

from a common point. United States patent 492,671 discloses a cinder, dust and smoke excluder for car windows having beveled triangular plates which pivot like fan. United States Patent 602,967 discloses collapsible blinds for circular or arched windows comprising two fan shaped collapsible blinds with slats pivotally connected near the center of the circle forming the arch. United States patent 1,060,187 discloses a wind shield for automobiles radiators having triangular blades with flaring sides which rotate from a common pivot point. United States patent 4,776,380 discloses two sets of blades which fan out from the ends of a U-shaped frame and meet at the top of the frame. United States patent 4,699,195 discloses a collapsible blind for semi-circular arched windows with tapered blades that fan out from a common axis of rotation. United States Patent 4,934,4334, United States Patent 4,934,436 and United States Patent 5,002,112 disclose pleated or multi-cellular shade fabric which deploy fanlike from a common point. United States patent 5,117,889 discloses a blind with slats attached to a pivot bolt. United States patent 5,584,329 discloses a moveable shade for arched windows with triangular type blades with center ends attached pivotally at a bottom center of a window arc and outside ends rotated from the bottom outside edges of the arc to a top center of the arc.

The second category of prior art inventions for covering circular or half-circular openings involves linear pivoting. For decorative purposes, linear pivoting is most desirable because when the blades or slats are in a closed position the surface presented will be flat. By linear pivoting is meant that each blade or slat is connected to a support so that the blade or slat rotates about the axis of the two points of connection. The blades or slats must be rotatable connected to a semi-circular base and a semi-circular top support. United States patent 4,936, 048 discloses a swivel

shutter with slats pivotally mounted in a rectangular frame. United States Patent 1,447,189 discloses linear pivoting of slats in a manner similar to the pitch adjustment of a propeller in an semi-circular frame.

The advent of lightweight materials such as foam polyvinyl chloride make the construction of lightweight shutters for arched windows possible. Likewise, composite materials such as bonded sawdust and resin provide lightweight construction materials. Additionally, both foam PVC and composite materials covered with a thin plastic skin provide materials which also allow a wide range of colors for matching to the installation site. Half-circle windows normally are installed above a rectangular window. Therefore, a further advantage of these lightweight materials and the ability to match colors is that the half circle shutter can be utilized in conjunction with either shutters or blinds on the rectangular window. The ability to match a half circle shutter with Venetian blinds as well as shutters provides for a wide range of adaptability of the arched shutter/blind. Finally, these lightweight materials allow a wide variety of pre-fabricated shutters for arched windows to be mass-produced thereby keeping costs down while maintaining a high quality appearance.

However, problems arise in constructing a semi-circular shutter out of such lightweight materials when linear pivoting of each slat is employed. Each slat must be anchored in a top support and a bottom support. Slats can be formed from composite materials with prongs at either end for mating with holes in the base and the top support. The first problem that arises is that, on larger shutters, the semi-circular top support can deform in handling so that the blades may become detached and fall out. For example, if the arched shutter is lifted by the top support

it may deform slightly increasing the distance between the top support and bottom support to the point where the distance exceeds the length of the top prong of one or more slats. Another problem arises in keeping the tops of the blades uniformly aligned with the top support. Minor variations in the shape of the arch of the top support will be noticeable if the distance between the top of the slats and the top support varies. Moreover, such non-uniform distances will not only detract from the appearance but will also increase light leakage between the slats and the support. An additional problem that arises in mass manufacturing shutters for semi-circular windows is to increase the range of window sizes to which one shutter for a semi-circular window can be affixed. For example, the top support has a front decorative trim element that covers the space between the top support and the arch of the wall around the window to be shuttered. The wall arch is usually not geometrically perfect and can vary considerably from window to window. Thus the front decorative trim of the top support covers the intervening space. Additionally, the front decorative trim allows for a range of window sizes to be serviced by one shutter size. The larger the area of the front decorative trim the greater the range of window sizes that can be serviced by one arched shutter. A further problem in constructing arched blinds with linearly pivoting slats is to maintain a smooth surface appearance with the slats are closed while minimizing light leakage between the slats. If the slats are made to overlap they will not lie in the same plane when closed thereby distracting from the desired appearance. Finally, there exists a need for the slats to be capable of being individually turned and for each slats to remain in the position to which each individual slat has been turned. The prior art does not address these problems. Therefore, what is needed beyond the prior art is a semi-circular

shutter that can be constructed of lightweight materials (1) so the slats will not fall out when the shutter is lifted or moved due to deformation of the outer frame, (2) so that light leakage between the slats and between the slats and the support will be minimized, (3) so that the shutter is adaptable to a range of arched window sizes, and (4) so that the individual slats can be turned and remain in position.

SUMMARY OF THE INVENTION

The present invention which meets the needs identified above is a shutter for half-circle window having a top, a base, and a plurality of slats capable of interlocking engagement and rotatably secured between the top and the base wherein the slats are further held in position by springs providing pressure against the slats.

The foregoing and other features and advantages of the invention will be apparent from the following more particular description of a preferred embodiment of the invention, as illustrated in the accompanying drawings wherein like reference numbers represent like parts of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 depicts a right front perspective view of the apparatus.

Fig. 2 depicts a right rear perspective view of the apparatus.

Fig. 3 depicts a front view of the apparatus.

Fig. 4 depicts a rear view of the apparatus.

Fig. 5 depicts a detail view of the slats and base.

Fig. 6 provides a view of a single slat.

Fig. 7 provides a cross section view along line 7-7 of fig. 6.

Fig. 8 shows an exploded view of the apparatus.

Fig. 9 shows an exploded view of the apparatus with variation.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT.

Fig. 1 shows shutter **100** with base **10**, top **40** and a plurality of slats **30**. Base **10** has baseboard **16**, base front **20**, base rear **24**, base slat support **22**. Top **40** has outer ridge **46**, top front **42** and inner ridge **44**. Outer ridge **46** may be molded into top front **42** or may be fixedly attached to ~~base~~ top front **42**. Inner ridge **44** may be molded into top front **42** or may be fixedly attached to ~~base~~ top front **42**. Slats **30** have first edge **32** and second edge **34**. Baseboard **16** has baseboard top surface **14**.

Fig. 2 shows a rear perspective view of shutter **100**. Top **40** has top rear **48** and top support **50**. Base **10** has baseboard **16**, base rear **24**, and base slat support **22**. Slats **30** have first edge **32** and second edge **34**. Top rear **48** is fixedly attached to top support **50** by joints **60**. In the preferred embodiment, joints **60** are thin metal sheets folded at a right angle and nailed with two nails to top rear **48** and nailed with two nails to top support **50**. Alternatively, joints **60** may be affixed to top rear **48** and top support **50** by glue or adhesive. Further in the alternative, top rear **48** may be joined to top support **50** by glue or cement without joints **60**. Additionally, ~~Top~~ top rear **48** and top support **50** may be molded in one piece.

Figure 3 shows a front view of shutter **100** with slats **30** in the closed position. Figure 3 shows the desired flat surface appearance of shutter **100** when slats **30** are in the closed position. All slats **30** lie in the same plane. Light leakage at the tops of slats **30** is minimized by the uniform closure of the tops of slats **30** with top **40**. Light leakage between slats **30** is minimized by the interlocking engagement of slats **30** which will be detailed in Figs. 5, 6 and 7. Light leakage at the bottom of slats **30** is minimized by base front **20** which, in addition to its decorative function, provides an overlap of the bottoms of slats **30** and covers the space between the bottom of slats **30** and base slat support **22** (not shown in Fig. 3). The functional importance of base front **20** in concealing springs which provide upward lift to slats **30** is shown in Fig. 5.

Figure 4 shows a rear view of shutter **100** with slats **30** in the closed position. All slats **30** are of uniform size and shape and in the closed position, slats **30** present a flat surface in the same plane when closed and viewed from the rear. Top rear **48** is the area available for covering the gap between rear edge **54** of top **40** and the arched wall of the window to which shutter **100** is to be installed.

Figure 5 shows a detailed view of slats **30** joined to base slat support **22**. Springs **36** are positioned between slats **30** and base slat support **22**. Springs **36** provide upward pressure on slats **30** so that slat top **39** (see Fig. 6) will touch top support **50** (see ~~Fig~~ Figs. 2 and 3). Springs **36** are hidden by base front **20** and base rear **24** (see ~~Fig~~ Figs. 1, 2, 3 and 4).

Figure 6 is a ~~top~~ front view of slat **30**. Slat **30** has first edge **32** and slat first ridge **33**. Slat **30** also has slat second edge **34** and slat ~~first edge **32**~~ second ridge **37** (see Fig. 7). Slat **30** has slat top **39** and slat bottom **38**.

Figure 7 is a cross sectional view of slat **30** along line 7-7 of Fig. 6. Slat **30** has slat second edge **34** and slat first edge **32**. Slat first edge **32** has slat first ridge **33** and slat second edge **34** has slat second ridge **37**. The purpose of slat first ridge **33** and slat second ridge **37** is that when the slats are turned parallel to each other the edges will ~~dovetail~~ engages one another and minimize leakage of light between the slats. Slat first ridge **33** of slat **30** will engage slat second ridge **37** on the adjacent slat **30**.

Figure 8 is an exploded view of shutter **100** as seen from the rear showing the assembly of shutter **100**. Slats **30** are affixed to top **40** and base slat support **22** by securement devices **52**. Securement device **52** is inserted through a hole in top support **50** and into slat top ~~37~~ **39**. Securement device **52** is placed though hole in base slat support **22**, spring **36** is placed over securement device **52** and securement device **52** is affixed to slat bottom **38**. In the preferred embodiment, securement device **56** is a screw which is affixed to slat bottom **38** by being screwed into slat bottom **38** and which has a head which prevents the screw from passing completely through slat support **22**. Persons skilled in the art are aware of a variety of securement devices such as dowels, screws, nails, rods and bolts. Spring **36** keeps slat **30** in position up against top support **50** thereby minimizing light leakage between slat top ~~37~~ **39** and top support **50**. In addition, spring **36** maintains slat **30** in position by friction between slat top **39** and top **40** so that when each slat **30** is turned individually, each slat **30** will remain in the position to which it was turned. The process is repeated for each slat **30**. When all slats **30** have been affixed to base slat support **22** and top support **50**, stiffener **18** is placed between base slat support **22** and baseboard **16** so that the ends of base slat support will go over the ends of

stiffener **18** and base slat support **22** in glued to baseboard top surface **14** of baseboard **16**. Stiffener ~~16~~ 18 prevents warping of baseboard **16**. Base front **20** is then glued to base slat support **22** and baseboard top surface **14**. Base rear **24** is then glued to base slat support **22** and baseboard top surface **14**. Base front **20** and base rear **24** conceal slat bottoms ~~34~~ 38 and springs **36**.

Fig. 9 shows an alternative placement of springs **36** where springs **36** are placed beneath base slat support **22** so that downward pressure is exerted on securement device **56**. Springs **36** exert sufficient downward pressure to cause slats **30** to remain in any position to which they are manually turned due to friction between slat bottom **38** and base slat support **22**.

Further in the alternative, springs **36** may be placed to provide upward pressure on slats **30**. In order to position springs **36** so that upward pressure on slats **30** is exerted, springs **36** are not placed between securement device **56** and base slat support but are placed in a manner to provide upward pressure on securement device **56**. Such manner of placement includes but is not limited to stapling of spring **56** to the bottom of base slat support **22** so that springs **36** are held in position and in compression to exert upward force against securement device **56** which in turn exerts upward pressure on slat **30**. Alternatively, a spring cover (not shown) may be affixed to base slat support **22** by screws, nails of adhesive so that springs **36** are held in position and in compression to exert upward force against securement device **56** which in turn exerts upward pressure on slat **30**. Therefore, when spring **36** is positioned beneath base slat support **22** so that upward pressure is exerted on slat **30**, spring **36** maintains slat **30** in position by friction between slat top **39** and top **40** so that when each slat **30** is turned individually, each slat **30** will remain in the position to which it was turned.

In an alternative embodiment, base **10** is comprised of a split baseboard so that stiffener **18** and base slat support **22** fit between two baseboard sections. Construction with a split base board brings a portion of the bottom slat **30** on the right and left side of base slat support **22** between the two baseboard sections and below the level shown for baseboard **16** in Fig. 8. Construction with a split baseboard allows an increase in the size of the surface area of top rear **48** and top front **42** (see Fig. 1) which increases the range of window arches to which one size of shutter **100** can be affixed.

With respect to the above description then, it is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.